# Meeting the Challenges of Particulate Air Pollution: EPA's PM Research Centers

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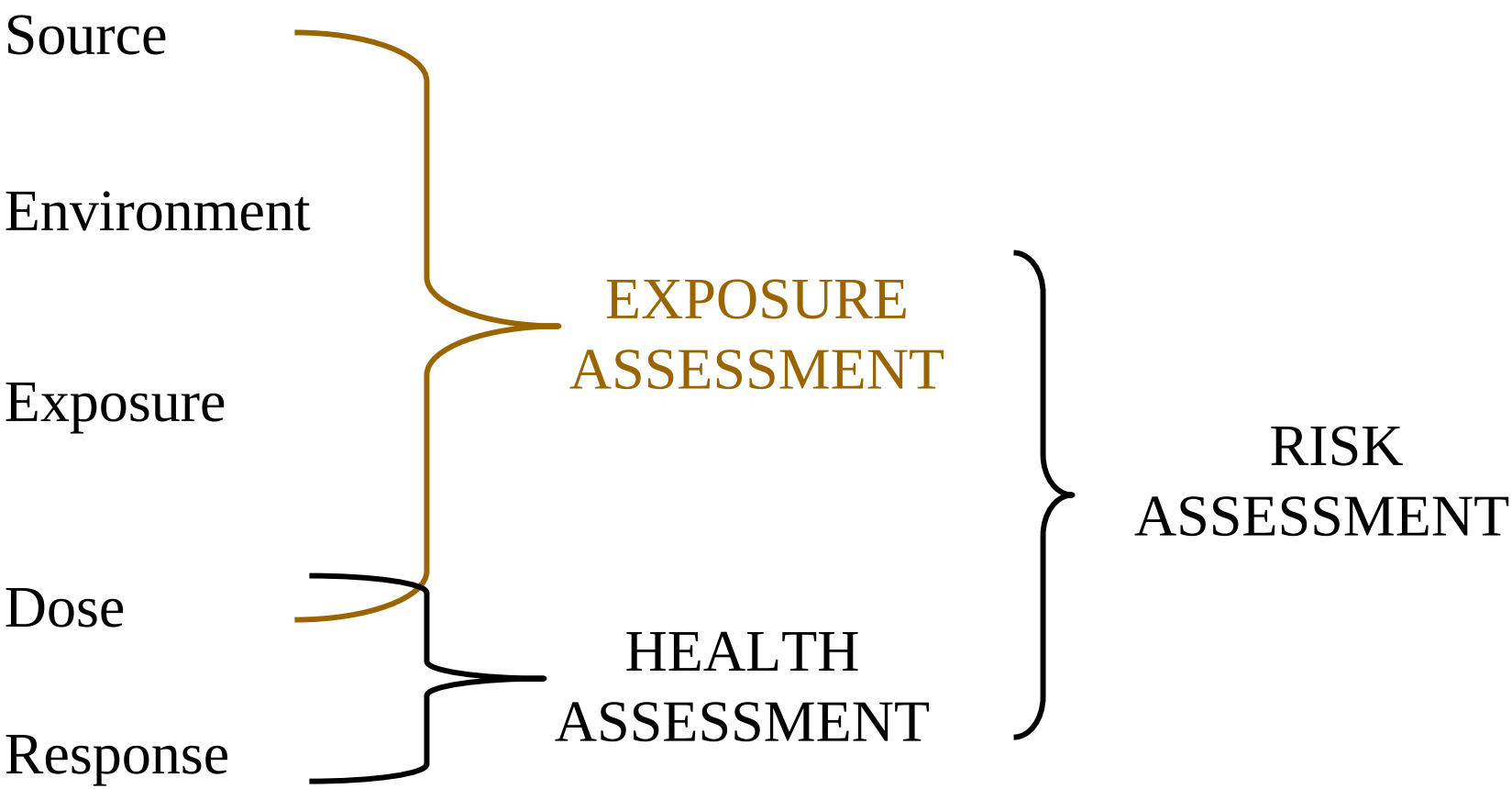
# Risk Assessment and Management Paradigm



# Perspective on Exposure

Source

Dose

Environment

Response

# Disease Causative Factors Are Gene-Environment Interactions

- Environment: What's exposure got to do with it?
  - Socio-economic factors
  - Pollution
  - Infectious disease
  - Personal habits (e.g., smoking, diet)
  - Interrelationships among all of the above

# What Contributions Can Exposure Analysis Bring to Public Health?

- Prevention
- Characterization of existing risk
- Risk intervention
- Design of more realistic animal toxicology studies
- Conduct of more quantitative epidemiological studies

# Beyond Mass

- Absent other population-level information, PM mass has served as an adequate and efficient surrogate of exposure to outdoor PM.
  - Good start, but not the whole story.
- For effective public health intervention, however, need better understanding
  - Composition for PM characterization
    - 'toxic' components
  - Composition for source attribution
  - Component-relevant exposure assessment
  - Spatial and temporal variability

# Susceptible Populations

- Susceptibility typically results from
  - Differences in biological susceptibility
  - Differences in exposures
    - Need a better understanding of behavioral factors that lead to differences in exposures and intake
    - Need to identify critical windows of exposure
      - Relevance to chronic and long-term disease outcomes

# Measures of Exposures

- Lessons to be learned from advancements in atmospheric sciences
  - Improved methods to measure and speciate PM and related co-pollutants
    - Beyond filters
    - Continuous or semi-continuous methods
  - Improved precision and accuracy
  - Better source attribution
    - Use of molecular markers